## Nicholas Vadivelu

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Experience

**Citadel** • Quantitative Research Intern

Jun 2021 - Aug 2021

**NVIDIA** • Performance Software Engineering Intern

Aug 2020 - Dec 2020

- Reduced BERT/Megatron inference latency by up to 30% by enabling sparsity for TensorRT in C++
- Open-sourced sparse BERT in **Python**, democratizing the current fastest inference implementation

**Uber ATG** · Research Intern

Jan 2020 - Aug 2020

- Improved **object detection by 90%** (AP) and **motion forecasting by 22%** (L2) of a self-driving neural net under realistic positional error, significantly improving safety for future riders
- Wrote a first author paper on the learned positional error correction system (accepted at CoRL)

Google Brain · Research Software Engineering Intern

May 2019 - Aug 2019

- Unlocked K-FAC for **over 370,000 users** by implementing and open-sourcing automatic support for arbitrary neural network architectures and integrating it into the Keras ecosystem %
- Enabled simple multi-node, multi-GPU/TPU training with efficient distributed operation placement
- Designed, created, and open-sourced idiomatic, reproducible training recipes for users %

John Hancock Financial · Data Science Intern

May 2018 - Aug 2018

- Achieved a fraud detection rate of 63% through designing an unsupervised machine learning model
- Deployed 25 fraud identifying heuristics in SQL that correctly flagged 100+ fraudulent claims

Sunnybrook Research Institute · Software Developer Intern

Jul 2017 - Aug 2017

- Improved MRI segmentation accuracy by up to 80% by via techniques like watershed and clustering
- Reduced time to contour MRI scans from ~5 hrs to ~40 mins through automation software

**Publications** 

**Nicholas Vadivelu**, Mengye Ren, James Tu, Jingkang Wang, Raquel Urtasun. Learning to Communicate and Correct Pose Errors. In *Conference on Robot Learning (CoRL)*, Virtual, 2020 %

Pranav Subramani, **Nicholas Vadivelu**, Gautam Kamath. Enabling Fast Differentially Private SGD via Just-in-Time Compilation and Vectorization. In *NeuRIPS PPML Workshop*, Virtual, 2020 %

Open Source

**PyTorch Ignite:** Improved metrics performance by **up to 63%** by designing and implementing **async updates for distributed metrics** with tests and documentation %

Leadership

**Data Science Club Lectures:** Designed and presented workshops on neural networks, machine learning, data cleaning, data visualization, MLOps, clustering, and more for **600+ students** %

WATonomous Design Team: Implemented real-time object detection in Tensorflow and OpenCV

**Projects** 

Pokemon Analysis: Scraped, visualized, and analyzed data with Markov chains, boosting, and more %

JAX ResNet: Open-sourced composable, unit-tested code and checkpoints for ResNet variants %

Thrive Life Simulator: Created a 3D ray-casting engine from scratch for a game in Java %

ShapeCheck: Published a framework agnostic runtime array/tensor checking library with CI to PyPI %

Education

**University of Waterloo** • Computer Science & Statistics (B. Math)

2017 - 2022

Research Assistant (Advisors: G. Kamath Fall 2020, P. Poupart Fall 2019, L. Tan Winter 2019)

Cumulative GPA: 3.94/4.00 - Dean's List